A Statement to the

NATIONAL COMMISSION ON AIR QUALITY

For a hearing

12 February 1979, Los Angeles, California

Regarding

THE DESIGN OF EFFICIENT AIR POLLUTION CONTROL STRATEGIES

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by

Gregory J. McRae* and Glen R. Cass*

1. This statement addresses gains in economic efficiency which could be obtained by removing barriers to advances in the technology and procedures commonly used for designing air pollution abatement strategies.

2. At the California Institute of Technology we are working on methods for defining the least costly means of attaining air quality objectives for chemically reactive pollutants in multiple source urban environments. Our joint experience includes the analysis of trends in ambient air quality (Refs. 1,2,3) and design of air quality models for photochemical oxidants, nitrogen oxides (Refs. 4,5), sulfur dioxide, sulfates (Ref. 6) and other fine particulates. We act as consultants on air pollution control strategy design. Our work has been sponsored or used by the California Air Resources Board, the South Coast Air Quality Management District, the U.S. Environmental Protection Agency and the U.S. Department of Energy. We wish to emphasize that our comments are given as individuals and not as representatives of Caltech or any of the agencies which support our work.

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2. The National Commission on Air Quality is charged with studying and reporting to Congress on the economic, technological and environmental consequences of pursuing the purposes and programs authorized by the Clean Air Act. We wish to suggest areas for investigation by the Commission which could lead to more cost-effective pollution control strategies.

It is possible with careful study and detailed evaluation of control alternatives to achieve enormous savings in pollution abatement costs. In a city the size of Los Angeles, there are large numbers of opportunities for emissions control. If one only guesses at an appropriate combination of abatement measures, it is clearly possible to spend a great deal more money on air pollution control than is actually necessary. For example, if one had made an intuitive selection between control measures contained in a recent South Coast Air Quality Management District report (Ref. 7), one could easily have spent hundreds of millions of dollars more annually to control sulfur oxides air pollution in this city than a careful analysis would show is actually needed. Control strategy studies costing about $200,000 (Ref. 6 and 7), however permitted an efficient choice between available alternatives in that case. Unfortunately, that level of planning effort is the exception rather than the rule in this country. While the methodologies for achieving such savings are available, there are three major barriers to their effective utilization: technology transfer, training and time.

3. While from a research point of view there are still many areas of uncertainty, it is important to recognize that much more scientific information is available about how to control a complex air pollution

problem than is routinely used to make air pollution control strategy decisions. A question to ask, and one the Commision might consider further is: "Why is all this information not being effectively used to improve the Nation's air quality?" From our own experience, one reason is that not enough effort is being made to communicate advances in air quality control strategy design procedures to state and local agencies in a form that they can readily assimilate into their control programs. It is not sufficient to merely describe new findings in Federal reports and scientific journals. Prototype air pollution control strategy studies should be sponsored which introduce state and local air pollution control officials to advanced air quality planning procedures within the context of resolving some real emission control problems.

4. Immediate resolution of the technology transfer problem will not be easy. At present there are an insufficient number of adequately trained people capable of performing full scale air pollution control strategy studies using the most advanced methods available. The problem is particularly bad in the case of photochemical oxidants. Photochemical oxidant air pollution, typically expressed as ozone, ranks today as one of the most serious and pervasive air pollution problems in the country. In 1975, about 86 percent (356 out of 416) of the ozone monitoring sites reporting to the National Aerometric Data Bank exceeded the National Ambient Air Quality Standard for ozone (Ref. 8). This must be contrasted with the observation that there are less than five (5) state or local agencies who are currently capable of rigorously evaluating the impact of a meteorologically and chemically explicit photochemical oxidant control strategy.

We do not feel that this situation arises from a lack of agency interest in oxidant air quality control. Rather, it arises from the fact that there are so few people trained to understand the design of emission control strategies for photochemical pollutants.

5. Perhaps one reason why so little technical sophistication is exhibited in most air quality plans formulated to date is that the deadlines set by Congress for performing air quality analyses are impossibly short. The 1970 amendments to the Clean Air Act (Sec 110 (a) (1)) provided a statutory deadline of nine months following adoption of an air quality standard for states and localities to formulate a plan for attaining the air quality goal. From our experience, the time needed for a highly trained group of engineers to design a technically sound abatement plan for a single chemically reactive air pollution problem in a major city is about two to three years (not including time for administrative review and approval). If inexperienced personnel must be trained first, then the time required for planning increases proportionately. One set of State Implementation Plans was hurriedly solicited in the early 1970's. A second round of Air Quality Maintenance Plans is currently under preparation; a step made necessary because many of the first plans failed to achieve their stated goals. By 1982, we expect a similar result and a new set of emission reduction measures will be sought. In ten years, we will have expended a great deal of effort on three consecutive unsuccessful clean up efforts devised under unreasonable time constraints. During that period there was enough time to develop at least one technically defensible air quality plan if the incentives and institutions had been different.

6. We have confined our comments to a few notes on barriers that prevent currently available technology from being brought to bear effectively on air quality control decisions. These remarks should not be interpreted as our advocacy of a purely 'technological fix' to the nation's air pollution problems. Rather, we have chosen to comment on a few areas in which we have particular experience. The hope is that advances in engineering practice permitted by more technology transfer, training and time will have beneficial results regardless of the system of direct regulation or economic incentives used to make air quality control decisions.

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